

# EFFECTIVENESS OF CARDIOTOCOGRAPHY TRAINING PROGRAMME ON KNOWLEDGE AND SKILL AMONG NURSES WORKING IN MATERNITY UNITS

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## Abstract :

The study was conducted to assess the effectiveness of Cardiotocography Training Programme on knowledge and skill among nurses working in the maternity units. An evaluative approach of pre experimental one group pretest – posttest research design was used. The present study was conducted in Sri Ramachandra Hospital, Chennai, India among 30 nurses working in the maternity units who satisfied the inclusion criteria. The samples were selected using convenient sampling technique. Cardiotocography Training Programme (CTP) was given after assessing the level of knowledge and skill in cardiotocography by pretest, followed by posttest on 7<sup>th</sup> day. The collected data were analyzed using descriptive and inferential statistics. A significant difference was found between pretest and posttest in level of knowledge and skill ( $P < 0.001$ ). The study findings showed that Cardiotocography Training Programme (CTP) were effective in increasing the knowledge and skill among nurses. There was no association found between level of knowledge and skill with demographic variables.

Keywords : Cardiotocography Training Programme (CTP), Knowledge, Skill, Nurses.

## Introduction :

Pregnancy is a wonderful, normal experience, which is a part of the cycle of every woman's life. It is a miracle that occurs by the union of two microscopic entities – an ovum and a sperm – that can produce a living being. The health of the fetus and the health of the mother are extensively linked with each other and thus midwife plays a major role in attaining this goal throughout pregnancy to till the time of delivery. The goal of perinatal nursing is to facilitate maximum physical and emotional well-being for the mother and her fetus.

Care given during the intrapartum period is the

'cornerstone of midwifery practice' which would help women both physically and emotionally (National Institute of Clinical Excellence (NICE) 2007). Continuous fetal heart monitoring during

pregnancy and labour gives an impression of the fetal well-being or fetal compromise thereby promoting the newborn's health status after birth. The past few decades have shown a notable increase in the number of techniques used to assess fetal well being that ranges from the relatively simple maternal assessment of fetal movement to more complex diagnostic tests guided by the ultrasound. One such technology developed is cardiotocography.

The cardiotocograph (CTG) measures the fetal heart rate and uterine contractions simultaneously which was developed by Dr. Koran Hammacher in collaboration with Hewlett Packard in the 1960's. Continuous electronic fetal monitoring (EFM) came into widespread in clinical use during 1970s to monitor fetal well-being during labour (Wheble et al, 1989). A CTG is an external electronic fetal monitoring system which records the fetal heart rate (cardio) through a transducer fixed on the mother's abdomen and the uterine contractions (toco) through the transducer placed at the fundus.

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Cardiotocography training mainly aims at preparing the nurse midwife to understand the tracings that projects fetal condition during antenatal and labour period thereby identifying the complications at the most earliest which in turn helps to reduce the perinatal mortality and morbidity.

#### Need for the study

The major cause of perinatal mortality is inadequate monitoring and care during labour by the skilled health professional. According to WHO (2011), perinatal deaths has decreased from 4.6 million in 1990 to 3.3 million in 2010. (%). It is identified that 99% of the perinatal mortality occurs in the developing country, out of which India has more than half of the deaths that accounts for about more than 9,00,000 newborn deaths per year (28% of the global total). The maternity health service plays a vital role in reducing the perinatal mortality rate. Nurses are those professionals who spend a lot of time with the mother during labour, hence nurses need to be competent enough to perform and interpret the tracings correctly and timely in order to promote the measures in reducing the fetal death.

It was suggested that midwife is expected to be adequately trained in CTG use, interpretation and regularly to update their knowledge and skill to render quality care (Andrew Symon, 2007).

Barrett Robinson (2008) insisted the interpreter to familiarize with the standardized, quantitative nomenclature recommended to describe intrapartum cardiotocography in order to reduce miscommunication among providers while caring the laboring mother.

Pehrson, Sorensen and Amer Wahlin, (2011) found that CTG training programmes increases the level of knowledge, interpretive skills, higher interobserver agreement, better management of intrapartum CTG and improved quality of care with computer based training (CBT).

Cardiotocography Training Programmes are conducted worldwide especially in abroad as an in-service or continuing nursing education programme, but not much flourished in India to empower the nurse midwife to be

competent enough in cardiotocography interpretation. As nursing profession has an array of expanded roles which mainly includes independent nurse practitioner, certified nurse midwife and so on, it is compulsory to have a profound knowledge regarding cardiotocography interpretation. Hence the investigator got motivated to perform a training programme on cardiotocography with a view to promote knowledge and skill among nurses on cardiotocography and to evaluate its effectiveness.

#### Statement of the Problem

A study to assess the effectiveness of Cardiotocography Training Programme on knowledge and skill among nurses working in maternity units at Sri Ramachandra Hospital, Chennai

#### Objectives of the study

- 1 Evaluate the effectiveness of cardiotocography training programme on knowledge among nurses.
- 1 Determine the effectiveness of cardiotocography training programme on skill among nurses.
- 1 Identify the relationship between knowledge and skill on cardiotocography among nurses.
- 1 Associate the level of knowledge and skill on cardiotocography with selected demographic variables of nurses.

#### Review of literature

An exploratory descriptive design was conducted to examine the attitude of midwives and doctors towards the use of CTG machine in labour ward maternity unit in Northern Ireland. The participants were 56 midwives and 19 doctors out of which 6 midwives and 2 doctors were randomly selected. Tool to measure the attitude and a follow-up semi-structured interview with doctors and midwives were administered. About 72.5% (n=29) viewed CTG technology positively and 87.5% (n=25) assured confidence about their skill in interpreting CTG tracings. Majority of the respondents (60%, n=24) felt that adequate training prepared them for using CTGs. Thus the study addressed regarding the training needs of qualified staff and regular updates in improving their knowledge and confidence level.

A descriptive study was conducted on the interpretation of CTG among midwives. About 4021 traces recorded, 764 were high risk pregnant mothers out of 2674 (67%) and 499 were apparent low risk mothers out of 1347 (34%). Questionnaires were sent to the midwives working in the peripheral units to evaluate the acquisition of knowledge, skill and level of satisfaction. It was found that most of the nurses had inadequate knowledge in CTG interpretation.

Systematic review of the 20 studies was conducted on describing and evaluating CTG training programmes which concluded that there is an increase in the level of knowledge and interpretive skills, higher interobserver agreement, better management of intrapartum CTG and improved quality of care with computer based training (CBT). The researcher also recommended training as it improves CTG competence and clinical practice. Also the researcher focused for further research on CBT, test-enhanced learning and long-term retention, evaluation of training and impact on clinical outcomes.

#### Materials and Methods :

Research design adopted for this study was pre experimental one group pretest – posttest design.

Group	Pretest	Intervention	Posttest (7 <sup>th</sup> day)
Study group	O <sub>1</sub>	*X	O <sub>2</sub>

Key:

O<sub>1</sub>- Pretest

\* - Routine activities

X -Intervention : Cardiocotography Training Programme (CTP)

O<sub>2</sub>-Posttest on 7<sup>th</sup> day

#### Research Setting

The study was conducted in the new block antenatal ward, labour room, postnatal and gynaecology ward at Sri Ramachandra Hospital, Porur, Chennai. It is multispeciality, University teaching hospital with 1740 beds. The antenatal, labour room, postnatal and gynaec wards are situated in the third floor of the G block. Each area has got separate class rooms with LCD projection facilities where the study was carried out to assess the knowledge and skill on cardiocotography.

#### Population :

Population of the study was nurses working in the maternity units (antenatal ward, labour room, postnatal and gynaecology ward) of Sri Ramachandra Hospital, Chennai.

#### Sample, Sample Size and Sampling technique

Sample of the study were nurses working in the maternity units (antenatal ward, labour room, postnatal and gynaecology ward) who satisfied the inclusion criteria. The sample size was thirty. The samples were selected using convenience sampling technique.

#### Data Collection Tool

Data collection tool were consisted of three sections

Section A – Demographic Variables

Section B – Structured questionnaire on Knowledge categorized under 3 headings

I. General facts on cardiocotography and procedure (10 questions).

II. Interpretation of cardiocotography (12 questions).

III. Nurses role in CTG (8 questions).

Section C – Structured questionnaire on skill

#### Data Collection Process

Ethics committee for the student proposal, Sri Ramachandra University approved the conduction of the study. Permission was obtained from the Chairman, Nursing Education, Head of the Department, Obstetrics and Gynaecology, Sri Ramachandra University and written permission from the Medical Superintendent and Deputy Nursing Supervisor, Sri Ramachandra Hospital to conduct the study. The study group consisted of a total of 30 nurses, who met the inclusion criteria, as samples which were conveniently selected. The objective of the study was explained to each nurses and consent was obtained from them for participating in the study.

#### Statistical Analysis :

Descriptive statistics (frequency, percentage, mean, standard deviation) and inferential statistics (paired t-test, correlation and chi-square) were used to analyze the data and to test the hypothesis.

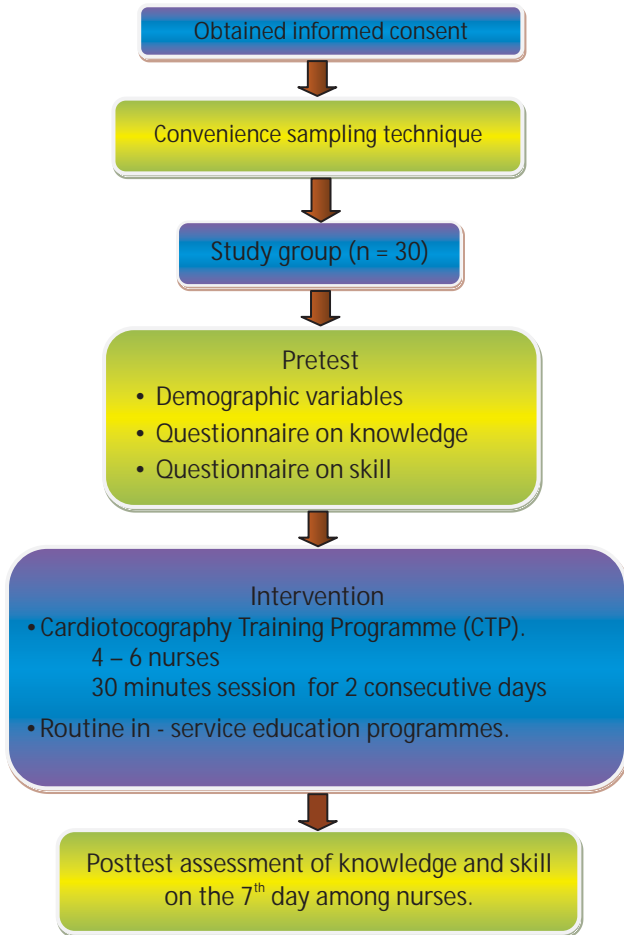


Figure 2 : Schematic representation of data collection procedure

Statistical Analysis :

Descriptive statistics (frequency, percentage, mean, standard deviation) and inferential statistics (paired t-test, correlation and chi-square) were used to analyze the data and to test the hypothesis.

Results :

- | Comparison of level of knowledge on general facts on cardiotocography and procedure, 36.7% had inadequate level of knowledge and 46.7% had moderately adequate level of knowledge in pretest, whereas in posttest 93.3% of the nurses had adequate level of knowledge.
- | Regarding the level of knowledge on interpretation of cardiotocography, 76.6% had inadequate level of knowledge in pretest, whereas 93.3% had adequate level of knowledge in the posttest.

- | Considering the knowledge level on nurses' role in cardiotocography, 56.7% had inadequate level of knowledge in pretest whereas 66.7% had adequate level of knowledge in posttest.
- | Comparison of overall level of knowledge on cardiotocography showed 13 (43.3%) had inadequate and 17(56.7%) nurses had moderately adequate level of knowledge in pretest whereas in posttest, 28 (93.3%) had adequate level of knowledge on cardiotocography.
- | The mean and SD of the knowledge regarding general facts on cardiotocography and procedure in pretest (mean: 6.07, SD:1.780) and posttest (mean: 9.57, SD:0.568) showed a significant change at the level of  $p < 0.001$ .
- | There was a significant difference in the level of knowledge on interpretation of cardiotocography with mean and SD of 5.47 (1.634) and 10.57 (0.679) in pretest and posttest which was significant at the level of  $p < 0.001$ .
- | There was a significant difference regarding the nurses' role in cardiotocography with mean and SD of 3.97 (1.351) and 6.70 (0.915) in pretest and posttest which was statistically significant at the level of  $p < 0.001$ .
- | Majority (93.3%) of the nurses had inadequate level of skill in pretest whereas in posttest 83.3% had adequate level of skill in interpreting the cardiotocography tracings.
- | The mean and SD regarding the level of skill of nurses in interpreting the cardiotocography tracings showed a significant difference in pretest (mean:5.20, SD :1.324) and posttest (mean:12.40, SD: 0.855) which was statistically significant at the level of  $p < 0.001$ .
- | There was a weak negative correlation ( $r = -0.059$ ) between the level of knowledge and skill in pretest, whereas weak positive correlation ( $r=0.323$ ) in posttest.
- | There was no significant association between

demographic variables with the level of knowledge and skill among staff nurses in pretest and posttest.

#### Discussion :

The study findings were discussed based on the objectives as follows: The first objective was to evaluate the effectiveness of cardiocography training programme on knowledge among nurses. Regarding the level of knowledge on general facts on cardiocography and procedure, around 11 (36.7%, mean :6.07, SD:1.780) nurses had inadequate level of knowledge in pretest whereas in posttest it was found to be increased to 28 (93.3%, mean: 9.57, SD :0.568) with adequate level of knowledge with a high statistical significance of  $p < 0.001$ . With respect to interpretation of cardiocography, 23 (76.7%, mean: 5.47, SD: 1.634) had inadequate level of knowledge in pretest and in posttest it was further increased to 28 (93.3%, mean: 10.57, SD: 0.679) nurses with adequate level of knowledge which was statistically significant at the level of  $p < 0.001$ . Considering the nurses' role in cardiocography, around 17 (56.7%, mean: 3.97, SD: 1.351) nurses were found to have inadequate level of knowledge in pretest whereas in posttest, the level of knowledge was increased to adequate level by 66.7% among 20 nurses (mean: 6.70, SD: 0.915) which was statistically significant at the level of  $p < 0.001$  respectively. The overall level of knowledge on cardiocography showed that 13 (43.3%) had inadequate and 17 (56.7%) had moderately adequate level of knowledge in pretest whereas in posttest 28 (93.3%) had found to have adequate level of knowledge on cardiocography. This concluded that Cardiocography Training Programme had a very high statistically significant effect on the level of knowledge among staff nurses with the level of  $p < 0.001$ .

The second objective was to determine the effectiveness of cardiocography training programme on skill among nurses. It was found that majority of the nurses 28 (93.3%) had inadequate skill in pretest with a mean and standard deviation of 5.20 (1.324) in interpreting the cardiocography tracings. While in posttest, 25 (83.3%) nurses had adequate skill in interpreting the

cardiocography tracings with a mean and standard deviation of 12.40 (0.855). The findings showed a high statistical significance at the level of  $p < 0.001$ . Thus this proved that Cardiocography Training Programme had a high statistical significant effect on the level of skill in interpreting tracings among nurses.

The third objective was to identify the relationship between knowledge and skill on cardiocography among nurses. The relationship between the level of knowledge and level of skill on cardiocography among nurses was found using Pearson correlation ( $r$ ). It was found that there was a weak negative correlation ( $r = -0.059$ ) between knowledge and skill on cardiocography among nurses in pretest whereas a weak positive correlation ( $r = 0.323$ ) in posttest. this showed that Cardiocography Training Programme (CTP) improved the level of knowledge and skill among nurses.

The fourth objective was to associate the level of knowledge and skill on cardiocography with selected demographic variables of nurses. Association of the level of knowledge and skill with demographic variables among nurses on cardiocography was done using chi-square test. The study results represented that there was no significant association between the level of knowledge and skill with selected demographic variables among nurses.

#### Hypothesis :

The stated hypothesis for the first objective that 'There is a significant difference in knowledge of nurses before and after attending cardiocography training programme than those who do not' was accepted.

The stated hypothesis for the second objective 'There is a significant difference in the skill of nurses before and after attending Cardiocography Training Programme than those who do not' was accepted.

#### Conclusion:

Monitoring the fetal heart rate with cardiocograph machine is now very common in all the existing health care systems in the modern world. Nurse midwives are those personnel who spend a majority of their time along with

the mother during her entire hospital stay. Thus nurses play a pivotal role in identifying both the maternal and the fetal complications early thereby reducing the maternal and fetal mortality and morbidity. For this adequate level of knowledge and high interpretative skills should be necessary for each nurse which can be incorporated through Cardiocography Training Programme. Thus this study shows that Cardiocography Training Programme (CTP) was very effective in improving the level of knowledge and skill among nurses working in the maternity unit.

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#### Recommendations :

- | This study can be done on larger samples.
- | A similar study can be conducted among group as a follow-up after 3 months.
- | A comparative study can be conducted between nurses in maternity units of different hospitals to assess the effectiveness of Cardiocography Training Programme.
- | A similar study can be conducted using random sampling method.
- | A descriptive study can be conducted to assess the level of knowledge and skill on cardiocography among nurses.